

Effect of Educational Guidelines on Mothers' Knowledge, Attitude, and Practice regarding Dengue Fever Complications Prevention among their Children

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Abstract

Background: Dengue (break-bone fever) is a viral infection that spreads from mosquitoes to children. It is more common in tropical and subtropical climates. Assessing mothers' knowledge, attitude, and practices (KAP) is deemed necessary, yet, at present, to the best of knowledge, attitude, and practices. **Aim:** To determine the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children. **Subjects and method: Design:** A quasi-experimental research design was used to fulfill the aim of this study. **Setting:** The study was carried out in Pediatric outpatient clinics at Sohag University Hospital. **Subjects:** A purposive sample of 100 mothers involved in the current study from the previously selected settings. **Four tools were used:** Tool (I) a structured interview questionnaire, was composed of two parts: Part (1): Mothers' personal data, Part (2): Children's personal data; Tool (II) Mothers' knowledge regarding dengue fever, Tool (III) Mothers' attitude regarding dengue fever, (pre/post), and Tool (IV) Mothers' practice regarding dengue fever. **Results:** A statistically significant difference was detected between pregnant mothers' level of knowledge, attitude, and practice regarding dengue fever complications prevention among their children after educational guidelines implementation at ($P = <0.001$). **Conclusion:** Educational guidelines implementation has positively affected mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children. **Recommendations:** Educational instruction implementation regarding dengue fever is recommended in various maternity healthcare settings. Educational booklets should be provided about dengue fever complication prevention for mothers and taught using the booklet and illustrated pamphlets for each one to improve their knowledge.

Keywords: Children, Dengue fever, Educational guidelines, Knowledge and practice, Mothers.

Introduction

Young children, particularly infants are at a higher risk of developing severe dengue illness and complications than healthy adults. This is because their immune systems are weaker. So, it's especially important to keep infants and young children safe from mosquito bites. With quick medical attention, the worst impacts of severe dengue in children can be avoided (WHO, 2021).

Dengue fever is a viral illness caused by the dengue virus and can affect children and adults. It is transmitted through the bite of infected mosquitoes, primarily the *Aedes* species. The disease spread by the mosquito can reflect fever, weakness, exhaustion, and low energy the whole day. Children face these symptoms

quickly due to an underdeveloped immune system. Water pools are one of the prominent places for dengue-spreading mosquitoes to breed. Children playing near such areas or places with filth filled with mosquitoes increases the chances of a child getting affected by the disease (WHO, 2019).

Dengue fever, a neglected tropical disease, wreaks havoc on developing countries, particularly in Asia. It was initially identified in 1780, but the first occurrence of dengue in Bangladesh was reported in 1964 under the name "Dhaka/ Dacca fever" (Bashar et al., 2020).

Dengue fever is caused by four similar viruses spread by mosquitoes of the genus *Aedes*, which are common in tropical and subtropical areas worldwide. In rare cases, dengue fever can lead to a more serious form of the disease called

dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (WHO, 2021).

Children are more prone to get affected by dengue due to low immunity. Hence, high fever and weakness are among the first symptoms of the disease affecting a child. Low immunity makes children highly exposed to the condition (Centers for Disease Control and Prevention, 2023).

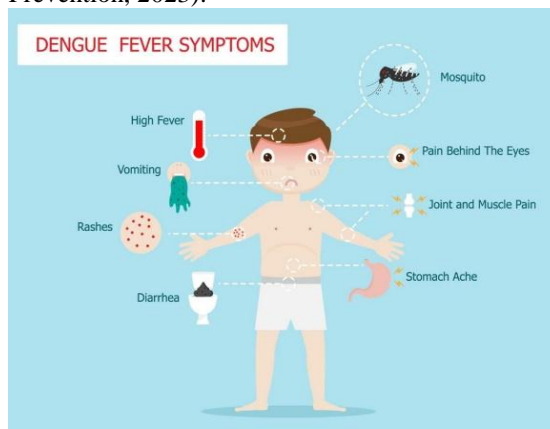
There are three stages in which **dengue fever in children** is divided to **Febrile Phase**–

This is the starting phase of the fever caused due to the disease. The fever in this stage may last for 2 to 7 days. The affected child may suffer from vomiting, diarrhea, and weakness. Continued symptoms need immediate medical attention. Ignoring these symptoms may also lead to severe health issues such as breathing problems, skin rashes, bleeding gums, and other similar problems. **Critical Phase**– This phase involves the appearance of symptoms such as heavy breathing, vomiting, bleeding nose, excessive passing of stool, and other similar issues. The critical step may indicate immediate medical assistance to treat the symptoms. The stage may also require hospitalization and continuous monitoring to avoid serious complications. **Recovery Stage**– This is the healing stage of the child. The symptoms gradually subside in this stage. Still, close monitoring and utmost care of the child are recommended to avoid sudden complications (WHO, 2022).

Dengue fever symptoms in children that can help identify the issue and heal it in time such as **High Fever**– High fever of up to 104 degrees Fahrenheit is one of the first symptoms of dengue in children. The fever can be caused due to the virus spread by the mosquito bite. If the fever is not treated on time, the condition may also be accompanied by weakness, joint pain, bleeding nose, and other similar conditions.

Rashes– If the symptoms grow severe, the affected children or infants may also suffer from rashes. Rashes can appear anywhere on the body of the affected. These dark red spots can be itchy and irritating, making carrying one with routine functions difficult. The rashes may grow speedily if not treated on time. **Vomiting and Diarrhea**– Vomiting and diarrhea are also some

of the symptoms of the disease. The condition may lead to dehydration and fainting if not treated promptly. The affected child cannot perform activities like walking, eating, or concentrating. **Low Appetite**– An irritated child cannot have proper meals due to the abovementioned symptoms (Centers for Disease Control and Prevention, 2023).



Signs of dehydration in children include Unusually sleepy, lack of energy, very fussy, Dry mouth, tongue, and lips, Fast breathing, Sunken eyes, Few or no tears when crying, Cool, discolored hands or feet, urinating less often, Urine is dark yellow and strong smelling. Children and infants with dengue may also become more irritable than usual and their appetite and sleep patterns may change (Bhatt, 2018).

Diagnostic laboratory testing is given priority in these situations. The justification for this behavior is that there is evidence to show that this disease is linked to serious clinical problems in expectant mothers, including an eightfold increase in mortality risk and a high incidence of thrombocytopenia, hemorrhagic presentations, premature delivery, miscarriage, and stillbirth. Data from referral health services are used in the majority of studies looking into the connection between dengue and pregnancy. The inclusion of more severe cases in this research may result in a selection bias, though (Friedman et al., 2018).

Sometimes, dengue can lead to severe complications, such as dengue hemorrhagic fever or dengue shock syndrome, which can be life-threatening. Immediate medical attention is necessary if a child shows signs of dengue fever (Brady, 2019).

The dengue fever treatment options for children help in quick recovery and easy healing as Lowering Fever– High temperature of affected children is one of the worrying issues in dengue. Hence, reducing the fever with the help of medications like paracetamol and sponge baths can help lower the temperature and calm the burning body. It also helps in cooling down the excess temperature instantly. Hydration– A child may get dehydrated due to continuous vomiting and diarrhea caused by the dengue virus. It is advised to keep the affected child hydrated to avoid severe complications constantly (Shafique et al., 2022).

People with severe dengue often need hospitalization. It's also important to look out for signs of dehydration in children. Dehydration happens when the body loses too much fluid due to fever, vomiting, diarrhea or not drinking enough fluids. Most cases of dengue fever go away within a week or two and won't cause any lasting problems. If someone has severe symptoms of the disease, or if symptoms get worse in the first day or two after the fever goes away, get medical care right away. This could be an indication of dengue fever, which is a medical emergency. In all cases of dengue infection, efforts should be made to keep the infected person from being bitten by mosquitoes. This will help prevent the illness from spreading to others (Governor et al., 2020).

Regarding Preventive Measures, there is no specific surgery or treatment to lower the high fever caused due to dengue in children. To protect the child from such issues, keeping children away from areas filled with dengue-spreading mosquitoes is recommended. Use mosquito nets to avoid mosquito bites and the spread of the virus including Rest, Drinking lots of water, staying hydrated, Eating nutritious food, and taking paracetamol to help with pain and fever, as recommended by your health professional, Sponge the skin with cool water to reduce fever, Avoid non-steroidal anti-inflammatory drugs, like ibuprofen and aspirin, as they can increase the risk of bleeding, Watch for severe symptoms and contact your doctor as soon as possible if you notice any.

Symptoms of dengue can become severe within a few hours. If you, or your child,

develops any symptoms of severe dengue, seek urgent medical attention immediately.

Preventing mosquito bites is still very important protection. Be sure to:

- Use screens on doors and windows, and promptly repair broken or damaged screens. Keep unscreened doors and windows shut.
- Have children wear long-sleeved shirts, long pants, shoes, and socks when they go outside and use mosquito netting over their beds at night.
- Use insect repellent as directed on kids. Choose one with the oil of lemon eucalyptus.
- Limit the amount of time kids spend outside during the day, especially in the hours around dawn and dusk when mosquitoes are most active.
- Don't give mosquitoes places to breed. They lay their eggs in water, so get rid of standing water in things like containers and discarded tires, and be sure to change the water in birdbaths, dog bowls, and flower vases at least once a week. By taking these precautions and keeping your family away from areas with dengue fever outbreaks, the risk of dengue fever is small for international travelers (Shafique et al., 2022).

The role of the pediatric and community health nurses can help mothers seeking the advice of a health professional for early diagnosis; cover, empty, and cleaning of domestic water storage containers every week; dispose of solid waste properly and remove artificial man-made mosquito breeding sites (vehicle tires, fruit cans, plastic bags) from the environment; drainage of water collection points around the house; and raising community awareness for mosquito control (Ribeiro et al., 2020 a).

Significance of the study:

There is no specific vaccine or medicine for dengue treatment. Because mosquitoes can bite through thin clothing, spray clothing with an insect repellent containing icaridin. Icaridin is less prone to irritate skin and doesn't harm plastics or synthetic materials. Sleep with bed nets (mosquito netting) that have been treated

with an insecticide like permethrin or deltamethrin. Around sleeping areas inside, use flying bug repellent (Shafique et al., 2022).

The incidence of dengue fever in increase in the past three decades, with 186,101 documented cases and more than 320 fatalities, occurred after a spike in yearly dengue infections. The health industry took extensive measures to contain the outbreak. However, the number of reported dengue cases increased once more in 2019, reaching 102,746, which was double the number of reported cases in 2018, which were 51,659, indicating the re-emergence of an outbreak. "In 2000, we had about half a million cases and in 2022 we recorded over 4.2 million, which really shows an eight-fold increase," he said in Egypt (WHO, 2020).

Additionally, it is assumed to demonstrate the interaction between respondents' KAP domains (WHO, 2021). Communities may be better able to prepare for and respond to public health emergencies if the KAP level is known. In addition, such research may help to create interventions that encourage desired behavioral changes (Dauda Goni et al., 2019).

There is a lack of research on KAP concerning DF. According to the KAP survey, we can assess the level of DF for this vulnerable group. The findings can assist the policies and strategies that reduce the risk of DF for these vulnerable people (Abir et al., 2021). There is thus an urgent need to conduct such studies to assess the impact of Dengue fever on children; hence the study was conducted to determine the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

Aim of the study:

This study aimed to determine the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children through:

- Assessing mothers' knowledge regarding dengue fever complications prevention among their children.
- Assessing mothers' attitudes regarding dengue fever complications prevention among their children.

- Assessing mothers' practice regarding dengue fever complications prevention among their children.

- Analyzing the association between mothers' knowledge and practice pre and post-educational guidelines.

- Evaluating the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

Research hypothesis:

Mothers' who received educational guidelines regarding dengue fever complications prevention among their children would experience an improvement in their knowledge, attitude, and practice levels post-implementation than pre-implementation.

Subjects and Methods:

Research design:

A quasi-experimental research design was used to fulfill the aim of this study

Setting:

The study was carried out in Pediatric Outpatient Clinics at Sohag University Hospital.

This setting was chosen because it serves the population in the nation and has a high frequency of children among the settings. One room in this clinic is separated into a diagnostic and examination space. Additionally, the researchers conducted interviews with the recruited mothers and their children in a waiting room for mothers' admission to put the educational guidelines into practice. From 9 am until 12 pm it was open.

Sample:

Based on the non-probability purposive sampling technique, a sample of 100 mothers was involved in the study from the previously chosen locations. The following criteria were used to choose these mothers:

The inclusion criteria were:

- Ranging in age from 20 to 35.
- They consented to participate in the study

The exclusion criteria were:

- Refused to participate.

- Mothers with mental illness or chronic conditions

Sample size calculation:

The power analysis level of significance of 0.95(=1-0.05=0.95) at alpha.05 (one-sided) with a big effect size (0.5) was used to determine the sample size, with 0.001 being utilized as the high significance level (Thompson, 2012).

Tools of data collection:

Four tools were used in this study as follows:

Tool (I): Mothers' interview questionnaire: it was developed by the researchers after analyzing related literature and expert comments for content validity. To avoid misunderstandings, it was translated into Arabic. It was adapted from (WHO, 2020; Shafique et al., 2022). It was composed of five parts:

Part (1): Mothers' personal data: It contained data which consisted of 3 items related to age, educational level, and place of residence.

Part (2): Children's personal data: It contained data which consisted of 3 items related to age, gender, birth order, and educational level.

Tool (II) Mothers' knowledge regarding dengue fever: To assess mothers' knowledge. It was adopted by (WHO, 2021; Governo et al., 2020; Barroso et al., 2020; Ministério et al., 2019); It consisted of 12 questions. It was used for all mothers in the study and was completed by the researchers. Multiple Choice Questions (MCQ) such as definition, types, causes, signs and symptoms, transmission, risk factors, Mosquito vectors of dengue fever, breeding sites of mosquitoes, who should be responsible for mosquito control and biting time of mosquitoes, prevention, treatment, and source of information.

Scoring system:

The following response scores were assigned: Each question has one correct answer; if the mother's answer is correct, the mother receives two grade, and a zero is assigned for an erroneous response or I do not know, and all selected options were tallied, and a score was assigned. The scores ranged from 0 to 24. Based on statistical analysis, the overall grades were summed together, the percentage computed for all participants, and knowledge level was regarded as satisfactory at the cut of point 60%, and unsatisfactory at less than 60%.

Tool (III) Mothers' attitude regarding dengue fever (pre/post): The researchers created it following a thorough analysis of the pertinent literature (WHO, 2021; WHO, 2020; Barroso et al., 2020); to assess the degree of mothers' reported attitude: It was created by the researcher after evaluating mothers' practice. It had nine multiple-choice questions on topics such as I want to help to reduce the number of dengue cases in my area, I check dengue situation or hotspots around my area regularly, I will take extra action to prevent dengue infection if I know the risk of being infected with dengue is increasing in my area, Removal of mosquito breeding sites at my premises will reduce the chance of dengue infection among my family members, Chemical fogging by health authority is good enough to prevent dengue infection, It is not my responsibility to remove mosquito breeding sites in my residences, It is necessary to continue the removal of mosquito breeding sites at home even during the period when there's no outbreak, a Dengue outbreak in my community can be controlled if every household is committed to removing mosquito breeding sites, I will take part in a public activity for dengue control or removal of mosquito breeding sites.

Scoring system:

In the Attitude assessment, which was three point Likert scale, strongly agree was scored 2/ agree was scored 1 whereas 'Not sure/Disagree' was given a 0 score. Mothers who scored higher scores indicated positive attitudes and mothers who scored lower scores indicated negative attitudes.

Tool (IV) Mothers' practice regarding dengue fever: pre/post): The researchers created it following a thorough analysis of the pertinent literature (WHO, 2021; Barroso et al., 2020); to determine the degree of mothers' reported practice: It was created by the researcher after evaluating mothers' practice. It had 13 multiple-choice questions (MCQs) on topics such as what you do in the first stage of fever. At home, what do you do in the first stage of fever? Do you store water at home? If yes, do you frequently change the stored water until it runs out?, Use mosquito repellent equipment, Use mosquito repellent creams, Use bed nets, Use window screens, Use a fan to drive away mosquitoes, Use smoke to drive away Mosquitoes, Cover the body with clothes, Cleaning of garbage/trash, Disposing of water-holding containers, and Cover water containers at home.

Scoring system:

The reported practice questions were in MCQ format, with a total score of 26 for the five elements; the right answer scored a 2, while the incorrect answer received a 0. If mothers reported their practices at a rate of greater than 60%, their practices were deemed adequate according to the method of total reported practices. Mothers whose reported practices fell below 60% were considered to have inadequate practices.

Validity of the tools:

The content validity of the tools, their clarity, comprehensiveness, appropriateness, and relevance were reviewed by five experts; three professors in the pediatric nursing field, one professor; in the community, and one professor; in the pediatric medicine field. No modifications were made according to the panel judgment to ensure sentence clarity and content appropriateness.

Reliability of the tools:

The first tool's reliability was ($r = 0.932$), the second tool's reliability was ($r = 0.945$), the third tool's reliability was ($r = 0.93$), and the fourth tool's reliability was rated as being good with a total score Cronbach's alpha of 0.87.

Fieldwork:

The researchers visited the previously selected settings three days / a week from 9 a.m. to 12 p.m. from the beginning of July to the end of August 2023. Approximately, 40-50 minutes were taken to complete each interview tool.

A pilot study:

To assess the clarity and feasibility of the data collection tools, a pilot study was conducted on 10% (10 pregnant women) of the total sample. To produce the final form of the tools, modifications were made. Pregnant women included in the pilot study were excluded from the study

Ethical considerations:

Before beginning the study, Ethical approval by the institutional review board of the Faculty of Nursing, Sohag University. The

researchers met with the directors of the selected setting to explain the study's aim and gain their cooperation.

To gain the cooperation of mothers, informal consent was gained. Both the study's objective and its anticipated results were stated. The mothers were informed of the study's objectives. The study's chosen participants were advised that their participation was completely voluntary and that they might leave the study at any moment, for any reason. Additionally, they were informed that their data would be protected and solely utilized for research purposes.

Administrative design:

Administrative permission was obtained through an issued letter from the Sohag University Director of the previously selected setting to achieve this study.

The actual study was divided into three phases:**Phase I: Preparatory phase:**

Once the research directors were made aware of the investigation's objectives, formal approval was obtained for data collection. Consent was obtained from the mothers who took part in the study. A survey of the literature on the various aspects of the concerns from the past and the present, both locally and globally, was conducted using books, essays, periodicals, and magazines. Guidelines were prepared in the Arabic language to cover many parts of the study topic created to close knowledge and practice gaps among mothers after examining pertinent Arabic and English literature.

Phase II: Implementation phase:

The researcher introduces herself to start a conversation and goes over the goals of the study during the first interview. Each participant in the study completed a pre-and post-test to gauge her degree of knowledge, attitude, and practices.

The instructional guidelines aimed to improve the mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

Specific objectives: At the end of instructional guidelines implementation each

mother should be able to:

- Explain the definition of dengue fever
- List the types, causes, and risk factors for dengue fever.
- Discuss the symptoms of dengue fever
- Recognize transmission methods of dengue fever.
- Explain Mosquito vectors of dengue fever.
- Describe Breeding sites of mosquitoes with dengue fever.
- Define mosquito control of dengue fever
- Identify the Biting time of mosquitoes of dengue fever
- Recognize the treatment of dengue fever.
- Describe preventive measures for dengue fever and its complications among children.

Each in-person interview with the mothers lasted between 40 and 50 minutes and was performed by the researcher. Mothers were greeted and introduced to the researcher prior to each interview. The researcher then went on to describe the study's scope and goals and obtain their informed consent. The researcher conducted a face-to-face pre-test with structured questions before disseminating the educational guidelines and evaluating personal information.

The educational guidelines included simple and clear information about dengue fever. It also included the preparation of educational materials such as Photos, videos, and PowerPoint presentations. Arabic brochure designed by the researchers; including educational guidelines regarding dengue fever was introduced to mothers at the end of the sessions.

The subject contents have been sequenced through four sessions (three sessions for theoretical content and one session for practice), and each session took 40- 50 minutes.

Contents of sessions

Session 1:

Before going on to the learning objectives of the next session, all researchers first discussed the information from the educational guidelines session. While speaking in Arabic which was easy for mothers to comprehend, the researchers first assessed the mothers' knowledge, attitude, and practice.

Session 2:

The theoretical portion included information on mothers' knowledge regarding dengue fever such as definition, types, causes, signs and symptoms, transmission, risk factors, mosquito vectors of dengue fever, breeding sites of mosquitoes, who should be responsible for mosquito control and biting time of mosquitoes, prevention, and treatment.

Session 3:

Included a role play about the practical part such as personal cleaning and fever control at home. Also, simulation intervention about storing water at home and frequently changes of the stored water, use mosquito repellent equipment, Use mosquito repellent creams, use bed nets, use window screens, use a fan to drive away mosquitoes, use smoke to drive away mosquitoes, cover the body with clothes, cleaning of garbage/trash, disposing of water-holding containers, and Cover water containers at home.

Session 4:

The researchers talked about the need for follow-up care and how major problems require referrals to continue treatment and prevent consequences.

Phase III: Evaluation phase:

The post-test was done one month to assess the effect of educational guidelines implementation on mothers' knowledge, attitude, and practice, regarding dengue fever complications prevention among their children using the same pretest data collection tools.

Statistical analysis:

The data were analyzed using SPSS statistical software version 20. Continuous data were obtained before and after the intervention and expressed as mean standard deviation (SD). Categorical data were expressed using numbers and percentages. The paired t-test was used to examine variations between each group before and after the intervention. A one-way repeated-measures analysis of variance (ANOVA) was used to examine changes in anxiety levels. Variables that did not adhere to the parametric assumptions were tested using the Mann-Whitney test. In the instance of noncontiguous data, the association between two variables was evaluated using the chi-square test. For statistical significance, a P value under 0.05 was required.

Results

Table (1): Shows that 80% of mothers aged between 18 < and 30 years with mean \pm SD 26.22 ± 4.57 , (34%) of them had secondary education, meanwhile, and also, it is also pointed out that 53% of mothers were not working. Finally, (57%) of mothers lived in rural areas and 43% of them were from urban areas.

Table (2): Indicates that less than half (45%) of studied children ranged from three to less than six years old with a mean of 3.45 ± 2.67 . Furthermore, 52% of the studied children were girls, and 43% of them were the second child among family children. Regarding educational level, it was observed that 45% of studied children were in nursery school.

Figure 1: Portrays that all of the studied mothers had not received any training regarding dengue fever.

Figure (2) highlights that the common source of knowledge about dengue fever among the studied mothers was doctors (80%)

Table (3): Shows that there was a highly significant difference and improvement between all items of knowledge **regarding dengue fever** among the studied mothers as the mothers had higher knowledge scores in all knowledge items post-educational **guidelines implementation** than pre-educational **guidelines implementation** (p-value <0.001**).

Figure (3): Portrays that there were statistically significant improvements in all items of mothers' total knowledge pre and post-educational guidelines implementation. Additionally, it demonstrates that 18% of the mothers had a satisfactory knowledge level regarding dengue fever pre-educational guidelines implementation which increases to be 80% post-educational guidelines implementation

Figure (4): Portrays that there were statistically significant improvements in mothers' total attitude pre and post-educational guidelines implementation. Additionally, it demonstrates that 17% of the mothers had a positive attitude level regarding dengue fever prevention pre-educational guidelines implementation which improved to be 79% post-educational guidelines implementation.

Figure 5 illustrates that 86% of the studied mothers had an inadequate level of practice pre-educational guidelines as compared with only 25% post-educational guidelines. On the other hand, only 14% of the studied mothers had an adequate level of practice pre-educational guidelines as compared with three-quarters (75%) post-instructional guidelines. This figure also shows highly statistically significant improvements and differences in the total practice level in pre/post-educational guidelines implementation.

Table (4): Shows After all significant factors ($P \leq 0.25$) were included in the analysis; the multivariable model (Table 4) revealed occupation as the independent predictor for good knowledge. Also, age is considered the independent predictor for good practices. Based on the 80% cut-off value, 50% of the study population possess an appropriate and acceptable attitude towards dengue prevention and this is associated with age, education, and occupation. In a multivariable model, age, education, and occupation were independent factors significantly associated with good attitude.

The mean score for knowledge was 10.4 out of 20 (Minimum: 2, Maximum: 18, SD: 3.7). Mean attitude score was 4.5 out of 6 (Minimum: 2, Maximum: 6, SD: 1.1) and mean practice score was 3.9 (Minimum: 2, Maximum: 6, SD: 0.9). There was a significant correlation (p value <0.001) between knowledge and attitude; knowledge and practice; attitude and practice (Table 5)

Table (1): Personal data of studied mothers (n=100)

Items	No.	%
Age in years		
18 < 30	75	80.0
30 < 40	25	20.0
Mean ±Stander deviation	26.22 ± 4.57	
Educational level		
- Illiterate	15	17.0
-Basic education	36	26.0
-Secondary education	24	34.0
-University education	25	23.0
Occupation		
- Working	37	47.0
- Not working	63	53.0
Residence		
- Rural	57	57.0
- Urban	43	43.0

Table (2): Personal data of the studied children (n=100)

Items	No.	%
Age		
3-<6 years	45	45.0
6-<9 years	35	35.0
9-12 years	20	20.0
Mean ± SD	3.45±2.67	
Gender		
Boys	48	48.0
Girls	52	52.0
Birth order		
First	33	33.0
Second	43	43.0
Third or more	24	24.0
Educational level		
Nursery school	45	45.0
First to third	40	40.0
Fourth to sixth	15	15.0

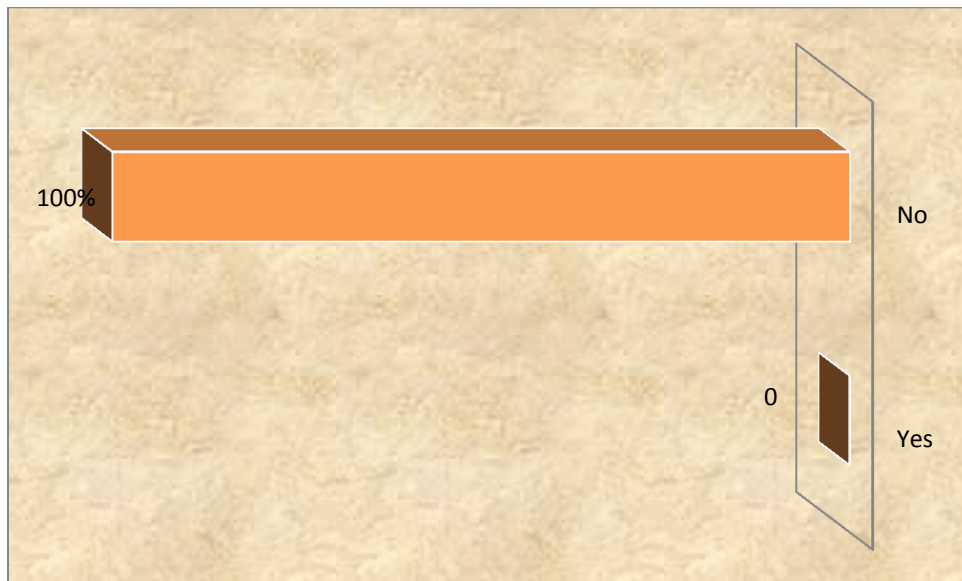


Figure 1: Distribution of the studied mothers regarding attendance previous training about dengue fever (N = 100)

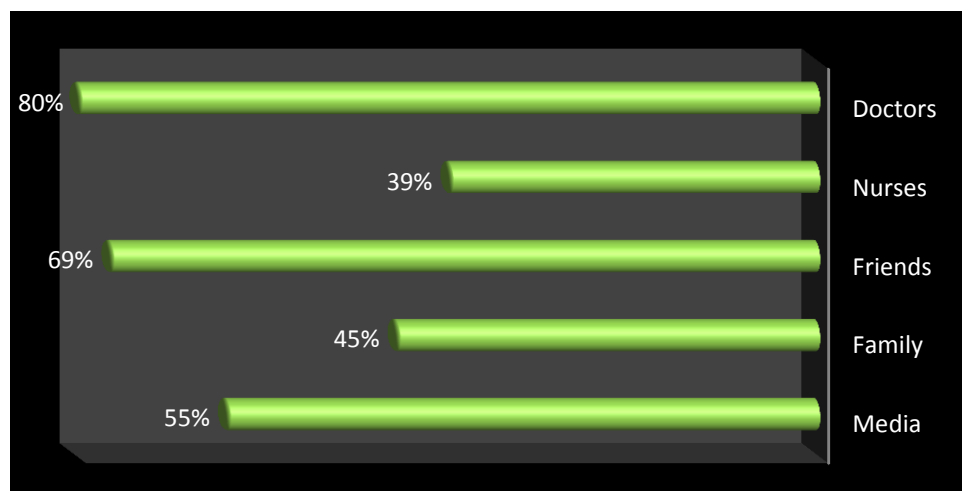


Figure 2: Source of knowledge among the studied mothers about dengue fever (N=200)

Table (3): Frequency and percentage distribution of the studied mother's knowledge regarding dengue fever pre and post- educational guidelines implementation (n=100)

Mother's knowledge	No =(100)				P-value
	Pre- educational guidelines		Post- educational guidelines		
	No	(%)	No	(%)	
Definition of dengue fever	10	10%	94	94%	<0.001*
Types of dengue fever	15	15%	86	86%	<0.001*
Causes of dengue fever	8	8%	82	82%	<0.001*
Signs and symptoms	16	16%	80	80%	<0.001*
Risk factors of dengue fever	9	9%	92	92%	<0.001*
Transmission of dengue fever	14	14%	86	86%	<0.001*
Mosquito vectors of dengue fever	10	10%	90	90%	<0.001*
Breeding sites of mosquitoes	16	16%	87	87%	<0.001*
Responsible for mosquito control	12	12%	90	90%	<0.001*
Biting time of mosquitoes	15	15%	79	79%	<0.001*
Management of dengue fever	18	18%	88	88%	<0.001*
Prevention of dengue fever	19	19%	89	89%	<0.001*

** Highly Statistical significant ($P \leq 0.001$) P value a: McNemar test⁵³

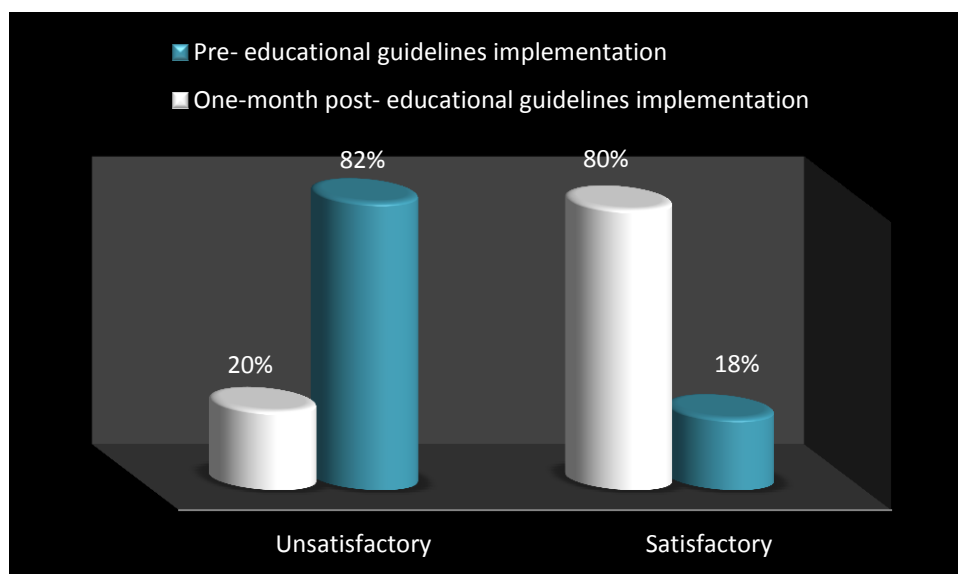


Figure (3): Total knowledge level among the studied mothers regarding dengue fever pre and one-month post-educational guidelines implementation (n=100).

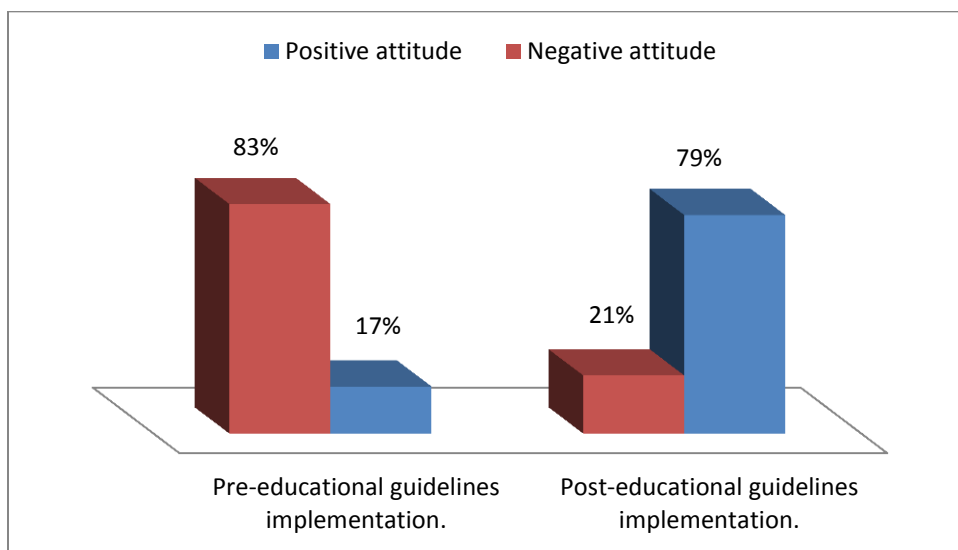


Figure (4): Total attitude level among the studied mothers regarding dengue fever prevention pre and post-educational guidelines implementation (n=100).

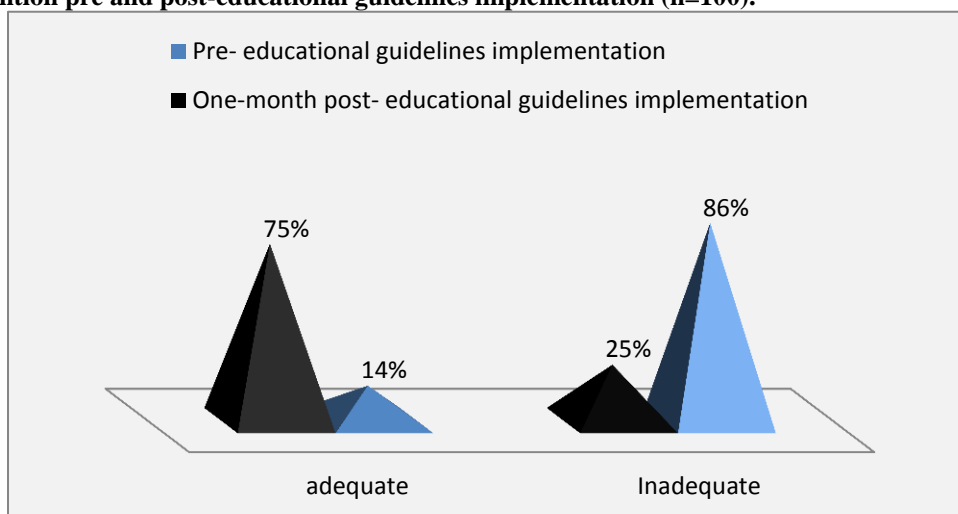


Figure (5): Total practice level among the studied mothers regarding dengue fever pre and one-month post-educational guidelines implementation (n=100).

Table 4. Multivariate analysis predictors of good KAP among the studied mothers

Data		Knowledge		Attitude		Practice	
		aOR	P	aOR	P	Aor	P
Age group	≤35	1.30 (0.87–1.94)	0.198	1.56 (1.05–2.32)	0.030*	3.08 (2.03–4.67)	<0.001*
	>35	1.30 (0.87–1.94)	0.198	1.56 (1.05–2.32)	0.030*	0.98 (0.66–1.46)	0.939
Education level	Primary education	1.78 (1.19–2.64)	0.005*	1.68 (1.13–2.50)	0.010*	1.37 (0.92–2.02)	0.118
	Secondary education	1.00					
Occupation	Working	1.78 (1.15–2.79)	0.010*	1.70 (1.09–2.65)	0.020*	1.38 (0.90–2.12)	0.140
	Not working						

The regression model due to small sample size. aOR, Adjusted odds ratio (at 95% confidence interval). *Significant Pvalue (P<0.05).

Table 5. Correlation between knowledge, attitude and practice scores among the studied mother

Items	r value* (95% CI)	P value
Knowledge – Attitude	0.865 (0.810-0.911)	<0.001
Knowledge – Practice	0.682 (0.611-0.746)	<0.001
Attitude – Practice	0.698 (0.627-0.761)	<0.001

*. Correlation is significant at the 0.05 level

Discussion

Around half of the world's population is at risk from dengue, a viral infection spread by the bite of numerous species of mosquito, it is more prevalent in tropical and subtropical climates. Although many cases are asymptomatic, the virus can cause a mild to severe flu-like sickness, and on rare occasions, death, but until now there hasn't been much convincing evidence connecting it to poorer outcomes for children (**Pawaria et al., 2019**).

Dengue can be prevented by taking a few precautionary steps like keeping mosquitoes away. Empty still water collected in containers such as pots, vases, or cans in the area near your home as mosquitoes breed in still water. To avoid mosquito bites, wear loose long-sleeved clothes, stay in cool areas, and use mosquito repellents and bed nets. It is always better to prevent dengue. Wear protective clothing (long pants and long-sleeved shirts) and use insect repellent with icaridin (Picaridin) (**Ribeiro et al., 2020**).

Human knowledge and behavior towards the environment have been reported to play an important role in the transmission of dengue by affecting its vector (**Pai et al., 2020**). Hence, the researchers conducted this study on the effect of educational guidelines on mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children.

The findings of this study showed that the majority of the studied mothers aged between 18 < and 30 years and more than half of them lived in rural areas. This could be one of the factors contributing to the knowledge deficit and resource gaps that exist more in rural than in urban areas.

The findings of this study showed that all of the studied mothers had not received any training regarding **dengue fever**. From the researchers' point of view, it confirmed the critical need for educational guidelines implementation.

The findings of this study showed that the common source of knowledge about dengue fever among the majority of the studied mothers was doctors. From the researchers' point of view, it reflected the significance of medical guidance. This result is similar to a study by **Swaddiwudhipong et al., (2018)**, who found that respondents cited health professionals/ workers as their primary sources of information about the disease. This indicates that health professionals in this area are not adequately mobilized for awareness-raising programs. This may reflect the importance of targeting future educational campaigns in these key sites in order to change the behavior of the people and effectively reflected on the knowledge, attitude and practice. Moreover, the educational system of healthcare professionals should emphasize more towards the basics of epidemiology and the prevention of infectious diseases. This will effectively improve the knowledge of physicians who can make a difference by enrolling themselves in educating the general population.

This result is not similar to a study by **Rahman et al. (2020)** about "Climate Change and Dengue Fever Knowledge, Attitudes and Practises in Bangladesh" which found that social media in Bangladesh has grown to be a significant source of news and information. That study was conducted in Delhi, India's urban slums. Additionally, **Kohli et al., (2019)** research showed that for DF, television is the main source of information.

Also, in a study by **Pai et al., (2020)**, the most common source of information about dengue knowledge came from media (including television, radio, and newspaper). This reflects the impact of public educational campaigns launched by the government on the general population. Media,

particularly television has played a major role in creating awareness among the public. This was similar to the reports of the study done in Kuala Lumpur (Shuaib et al., 2019).

The findings of this study showed that there was a highly significant difference and improvement between all items of knowledge regarding dengue fever among the studied mothers as the mothers had higher knowledge scores in all knowledge items post-educational guidelines implementation than pre-educational guidelines implementation. From the researchers' point of view, it reflected the positive effects of educational guidelines implementation.

The findings of this study showed that less than one-fifth of the mothers had a satisfactory knowledge level regarding dengue fever pre-educational guidelines implementation which increases to four-fifths post-educational guidelines implementation. According to the researcher, this demonstrated the significance of providing educational guidelines implementation for mothers to increase their knowledge.

According to the conclusions of the current study on this topic a study conducted by Chatchen et al., (2017) entitled "Slum Residents Lack Basic Awareness of Dengue Disease,". Most people were unaware of dengue.

Similarly, Rahman et al., (2022) discovered that many participants in our prior web-based research of the public and college students were unaware of the dengue virus's contagious behavior and a knowledge gap has been shown by inadequate mosquito breeding prevention methods. Additionally, it complies with a study from Bangladesh and Vietnam (Nguyen et al., 2017).

The current study's findings portrayed that there were statistically significant improvements in mothers' total attitude pre and post-educational guidelines implementation. This supported the good impact of offering educational guidelines from the researcher's perspective. Also, this demonstrated the effectiveness of educational guidelines implementation that is connected to knowledge advancements and reflected well on their attitudes.

The results of the current study revealed highly statistically significant improvements and differences in the total practice level in pre/post-educational guidelines implementation among the studied mothers. In the researcher's opinion, it reflected the success of the study's aim and the value of implementing educational guidelines that result in improvements in practice.

The knowledge, attitude, and practice in a study in Malaysia by Ghani, (2019) reported that participants from dengue hotspot areas have better knowledge and attitudes post the development of a proactive program to protect the health of vulnerable groups in the community. Results of previous Malaysian studies by Zaki, (2019) & Alhoot, (2017) showed that the urban/suburban communities generally have good knowledge of dengue and its symptoms, good practice in dengue prevention, and a positive attitude on dengue prevention. Also, a few other Abas et al., (2019) & and Mahyiddin et al., (2019) cited good dengue prevention practices among the urban/suburban communities and had good knowledge of dengue, attitudes, and practices in dengue prevention. This is consistent with earlier cross-sectional studies in Malaysia by Abdul Aziz, (2019).

According to the current study in analysis, multivariable model, occupation was the independent predictor for good knowledge. Also, age is considered the independent predictor for good practices. Based on the 80% cut-off value, 50% of the study population possesses an appropriate and acceptable attitude toward dengue prevention and this is associated with age, education, and occupation. In the multivariable model, age, education, and occupation were independent factors significantly associated with a good attitude.

This outcome might be that the mothers who work are more exhausted for extended periods at work. This may help to explain why rural and urban areas have different cultures, values, and beliefs. It may also help to explain why mothers in rural areas experience greater stress due to a lack of medical supplies, a lack of social media awareness, and difficulty traveling to a hospital or health center in urban areas when their children exhibit signs of infection.

Similarly, Other Malaysian study done by Ghani, (2019) has reported employment status to be associated with a good attitude toward dengue prevention.

However, the multivariate analysis revealed employment was an independent predictor of good knowledge. Many studies support a significant positive association between education and good knowledge of dengue (Wan et al., 2016; Ghani, 2019; Wong et al., 2019; while another study supports the effect of employment on knowledge) Naing et al., (2019). This could be because working adults are more likely to be involved in health campaigns and education in their workplace and have more information on dengue fever compared to the unemployed.

The present study reveals that correlations were found between the studied mothers' knowledge and attitude; knowledge and practice; attitude and practice. This association implies that good knowledge necessarily leads to improved attitude and finally leads to good practice. From the researchers' point of view, it reflected that a knowledge deficit leads to inadequate practices and negative attitudes. However, after administering the educational guidelines, this result reflects the benefit of educational guidelines, which met the mother's needs and provided them with sufficient knowledge, attitude, and practice to cope with this disease.

As knowledge improves, attitude and practice among participants also improve in the study area. Moreover, a significant positive association was observed between knowledge, attitude, and practice. Our results are most similar to some earlier studies (Kamel, 2017 and Nasaruddin et al., 2019) Whereas other studies only reported the correlation between knowledge of dengue with a positive attitude for dengue control⁵³ and between positive attitude and good practice of dengue prevention(Wan et al., 2016 and Lugova, & Wallis, 2017).

Previous study has reported that search and destroy practice requires good knowledge and skills in order to remove breeding sites efficiently (Carandang et al., 2020). Others Azfar, (2017); Lozano et al., (2018); Mahyiddin et al., (2019) saw no correlation between good

knowledge and practices

Conclusion

Based on the results and hypotheses of the present study, the study findings concluded that educational guidelines implementation has positively affected mothers' knowledge, attitude, and practice regarding dengue fever complications prevention among their children. There was a significant correlation(p value<0.001) between knowledge and attitude; knowledge and practice; attitude and practice.

Recommendations

The following suggestions are made based on the current study's findings:

- Educational instruction implementation regarding dengue fever is recommended in various maternity healthcare settings.
- Educational booklets should be provided about dengue fever complication prevention for mothers and taught using the booklet and illustrated pamphlets for each one to improve their knowledge.
- To generalize the findings from the current investigation, a larger sample of patients undergoing cardiac surgery in various settings is needed.

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